SOIL conservation

U. S. Department of Agriculture
Soil Conservation Service
October 1975

From the Administrator

Farming To Save Fuel

Continuing petroleum shortages and higher prices will mean more changes in agriculture as farmers search for ways to conserve fuel while maintaining yields. Changes will include rapid increases in some farming systems and virtual abandonment of others.

Minimum tillage, including no-till, is emerging as the most promising fuel saver for farmers. This practice has especially high potential for feed grains, cereals, soybeans, and cotton—the crops most in demand on the world market.

For example, one study shows that by switching from conventional tillage to slot-plant tillage for corn, a farmer can save 2.99 gallons of diesel fuel per acre. This figure includes all energy input, even that used to build the tillage equipment. USDA predicts that by the year 2000, minimum tillage could account for annual fuel savings of 850 million gallons in machinery operations.

Minimum tillage has other advantages too. It makes double-cropping or multicropping feasible in more parts of the country. It also cuts soil losses from water erosion and soil blowing and makes it possible to farm land with soil too erodible for conventional tillage.

Another energy saver is better management of irrigation water. SCS estimates that by increasing the efficiency of both delivery systems and on-farm irrigation, farmers could save more than 230 million gallons of fuel each year. The energy savings would vary with the type of irrigation system and from state to state, but the potential seems to be great. For example, a Nebraska study estimates that through more precise scheduling of sprinkler irrigation, $7.1 million of energy cost could be saved annually in that state alone, based on 1974 energy prices.

Although we can save a substantial amount of petroleum using the knowledge we have now, USDA and private groups are researching ways to save even more. Some experimenters are planting crops by air to eliminate all cultivation, for instance.

And USDA is researching energy sources other than petroleum for agricultural use. In two such projects, scientists are studying solar energy for drying crops and livestock wastes.

Districts need to be aware of continuing research on new energy-saving practices for farmers as well as those in use now. They must also be aware of the drawbacks involved. For example, we still do not know the long-term environmental effects of many herbicides and insecticides used with minimum tillage.

By keeping informed of current developments in agriculture, SCS and district people can help farmers use fuel more efficiently without cutting into their production.

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Earl L. Butz
Secretary of Agriculture

R. M. Davis, Administrator
Soil Conservation Service

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Taming the Tamarac River

by Thomas C. Gahm
Information specialist, SCS, St. Paul, Minnesota

It rose out of a bog in northern Marshall County and —depending on the season— trickled or raged its way for 40 miles over the fertile valley farmland into the Red River of the North.

In spring or after a heavy summer rain it would jump its banks and spill onto miles and miles of cropland. In the fall of a dry year its force would dwindle, and it would betray the town of Stephen which depended on it for municipal water. Too often the unsloping farmland within the watershed would be covered with water for too long, and crops would be lost to rot or disease.

That was Tamarac River a decade ago.

Today the story is different because the people of Marshall County decided to do something about it. Their land was some of the richest in the country, and they knew it could be even better.

They launched a watershed protection and flood prevention program, assisted by the Soil Conservation Service, on the quarter-million-acre Tamarac River watershed. That project is underway today. Although only partially completed, the project withstood its first severe test—and possibly the most strenuous it will ever face —early this summer. The 8 inches of rain that fell on July 1 have resulted in much of the Red River Valley being declared a disaster area, but damage was noticeably less where the dams, channeling, river bank improvement, and soil conservation practices of the Tamarac River Watershed Project were in place.

Hilary Kuznia, who farms 450 acres near Florian, figures he lost 15 percent of his crop yield because of the heavy rain this year. The Tamarac River and one of the project's four branch channels go through his farm. Kuznia believes that without that channel his loss would have been more like 50 percent.

"Without that ditch the water wouldn't have gone off the fields for 48 to 72 hours," he said. "That channel took the water off in 24 hours and the crops survived."

Getting excess water off the fields is one of the main problems the Red River Valley farmer faces. Natural drainage is minimal because the land is as flat as a table top, and tile drainage is virtually impossible because of the heavy soils of the area.

This water management problem is the primary one the Tamarac River Watershed Project is tackling. The project calls for 40 miles of channeling. Except for 2 miles of new channeling, this will consist of improving existing channels. The four branch channels move excess water from fields into the Tamarac, and about 8 miles of the Tamarac's main channel are being widened to double the capacity of the river.

As the channels are completed, banks are seeded and inlets are designed to control soil erosion and keep the channels free of sediment and other debris.

Most of the main channel work on the Tamarac has been finished.

"Guys along the Tamarac didn't lose enough to cry this year, when previously they would have lost it all," says Lawrence Kuznia, who farms 5 miles northeast of Stephen. "Areas that flooded in past years, when water levels were lower than this year, weren't flooded this year," said the cousin of Hilary Kuznia.

An ardent supporter of the watershed project, Lawrence Kuznia believes that Marshall County is one of the richest in the valley—and getting richer. "We're draining so much of the county that was never in production before. Good farming is a reality where it never was before."

Kuznia farms 4,360 acres and

says that 1,100 of them have suffered from crop disease because water did not move off them fast enough. Much of his land is along a yet uncompleted branch channel.

"This branch just has to go in to save us all," he says.

More obvious than the channels are the two dams of the Tamarac River Watershed Project. These are designed for several functions, including holding back floodwater and creating bodies of water for human and wildlife use.

The East Park Flood Control and Wildlife Management Area is located at the headwaters of the Tamarac about 6 miles east of Stranquist, and was the first part of the watershed project completed. Water from 44,000 acres is held behind the dam and released as needed. The dam can store 4,520 feet of floodwater, and in so doing, creates waterfowl habitat and a popular hunting area in the marshy area behind the dam.

Two weeks after the big rainstorm, water was being released through the dam still a couple feet higher than normal. Hilary Kuznia, 18 miles west of the dam, believes that he would have been flooded had the East Park Dam not been there to hold the water back.

While the dam keeps unwanted water off the farms below it during the wet season, its capacity is such that it stores water for the town of Stephen during the drier times. The water it holds is assurance that the community will have a sufficient year-round water supply.

"Three years ago, it was very dry and we almost lost our water supply," recalls Mayor Lawrence Sunsdahl. "But last year, because of the water backed up behind the dam, the river flowed full all fall, and the town's reservoir was full all winter.

"The town's main concern is about the water supply aspects of this project, although flood control is more important to us than we realized it would be."

Sunsdahl said the widened Tamarac channel going west out of Stephen saved the town from flood damage this year because it moved the water out faster, rather than allowing it to back up into the town.

Downstream from the East Park Dam and Wildlife Management Area, the new Overton Dam straddles the Tamarac. Its most obvious function when completed will be the creation of an 80-acre lake. A lake is about as rare as a hill in this part of the country, and people have already planned a variety of public recreational uses.

Known as Florian Flood Control and Recreation Area, this part of the project will result in a county park with campsites, a swimming beach, and a boat landing.

The lake will be more than 20 feet deep in spots and will

Water runs over the East Park Dam at the headwaters of the Tamarac 2 weeks after the July 1 flood. The dam protects the cropland below and provides habitat for wildlife.

be full by next spring—or by this fall if there is much rain.

Stephen, Marshall County, and the Marshall Soil and Water Conservation District are sharing costs of the nearly $3 million watershed project with the federal government. SCS is providing more than $2 million in financial assistance and technical help to the local sponsors and landowners.

Everyone in the watershed is being assessed by the county for the improvement works. Mayor Sunsdahl says Stephen will pay $1,000 a year for 10 years. Farmers are assessed according to the benefit they will receive. Hilary Kuznia, for example, pays $130 a year for 10 years on his 450 acres.

"The way I look at the assessment," he says, "is that it benefits the community as a whole."

Dennis Pate, SCS district conservationist at Warren, says there is good support for the project among farmers of the area as evidenced by the fact that 65 percent of the farmers in the Tamarac watershed are signed up as cooperators with the Marshall Soil and Water Conservation District. About 25 percent of the county as a whole is signed up with the conservation district.

All the farmers along the main channel are operating their land with conservation plans, according to Pate.

"Farmers who are signed up as cooperators and practicing conservation, such as windbreaks and minimum tillage, are actually helping assure the longevity of the watershed project," he says. "By controlling soil erosion in the uplands of the watershed, they are keeping silt and sediment out of the channels and the Tamarac itself."

Harry M. Major, SCS state conservationist, says that the practice of soil conservation by farmers is really the main part of a watershed project in the eyes of the SCS.

"A watershed project is actually planning good resource management and conservation for the whole watershed," Major said. "The more landowners who are cooperating in the conservation effort, the better the watershed project will be."

The Tamarac River Watershed Project, which includes part of Roseau and Kittson Counties, in addition to Marshall, is one of eight currently under operation in Minnesota by SCS under PL-566, the Small Watershed Protection and Flood Prevention Act.

Another seven projects have already been completed. ♦

The Meaning of L.I.F.E.

by Gene Warren
Information officer, SCS, Alexandria, Louisiana

Walk up to most folks in Franklin Parish, Louisiana, and say, "What's LIFE?" and chances are they won't say "breathing in and out"; the answer most often is, "Let's Improve Franklin's Environment." Individual groups and total communities in Franklin Parish are so involved in improving the environment that you almost get a fine for not displaying a LIFE bumper sticker.

It all began in 1972 when the Northeast Soil and Water Conservation District conceived the idea for the Parish project. Mayors, the police jury (commission court), civic groups, and just about everybody old enough to hold a broom liked the idea and LIFE was born.

Franklin Parish was in need of a facelifting—most parish people agreed on that. Old cars were stacked everywhere . . . litter lined many roads . . . drainage was poor . . . towns needed sprucing up.

After more than 100 meetings with groups, proclamations by mayors, cleanup days, LIFE parades, and a long list of other action-prompting events LIFE has, indeed, come to life.

"I've never seen anything like it," Northeast District Supervisor Allen Cruce said. "Once we got the project going local people flocked like bees to help. Just goes to show you that people really are concerned about their environment."

LIFE benefits are now flowing in Franklin Parish—most of the junk cars have been hauled away, plantings have been made along roads and in downtown areas, including more than 1,000 crapemyrtles and 10,000 pine seedlings, and the parish police jury now has plans for a parish waste disposal system.

A new nine-member LIFE junior board has been formed and is working to involve parish youth in conservation projects.

District Chairman Kirby Tillotson says the sky is the limit when it comes to cooperation. "I believe our people will get behind us on any project that will improve the environment." ♦

Erosion and Sediment Control Guides Published in More Than 13 States

Because of the growing concern about sediment pollution many state offices of the Soil Conservation Service as well as state agencies are publishing guides for controlling erosion and sediment on construction sites.

These guides contain descriptions of various erosion control measures and how-to information for establishing vegetation and designing and installing structures. They may be used by property owners, land developers, city planners, engineers, and county and state officials in connection with sedimentation control laws recently passed by many states. They are also used as manuals by municipal and county governments in enacting sediment control ordinances.

Among the first was the *Guide for Sediment Control on Construction Sites in North Carolina,* published in 1973, and now in its third printing. When the North Carolina Sedimentation Control Commission was established, it adopted the guide as its operations manual. More than 7,000 copies of the 220-page book have been printed.

One of the most recent publications is *Guidelines for Soil and Water Conservation in Urbanizing Areas in Massachusetts,* released in April. William P. Annable, SCS assistant state conservation engineer, said the guide is designed to help create an awareness of the problems of erosion and sediment control and water management as well as showing how these problems can be handled.

Other states with published sediment guides include Connecticut, Hawaii, Indiana, Maryland, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Rhode Island, Virginia, West Virginia, and Wisconsin.

Oregon Cooperators Named Farm Family Of the Year

"City people who returned to the land and made outstanding progress as farmers" is the way Secretary of Agriculture Earl L. Butz described James and Patricia Ottoman when they were selected as the Farmers Home Administration National Farm Family of the Year.

Cooperators with the Klamath Soil and Water Conservation District in Oregon, the Ottomans note their firm belief that land should be improved for future generations. Each year, they put aside funds in their operating budget for soil and water improvements.

When they bought their farm, it was a 40-acre clover field with no improvements, many ditches, and a high water table—but with excellent loamy soil. Over the years they have transformed the open field into a productive farm and gradually improved and increased their farmland holdings. They have installed an irrigation system and laid tile drains.

Reared in the city of Klamath Falls, the Ottomans have learned to use good farm practices along with soil and water improvements to increase the productivity of their farm. Their largest crop is potatoes, with 115 acres yielding 380 sacks per acre. They also raise alfalfa and barley. ♦

Bicentennial Park

A previously unused lot is now the "Northridge Bicentennial Park" in Bismarck, North Dakota, thanks to work by students and by personnel from the city, school, and Soil Conservation Service.

Thirty second-grade students at Northridge Elementary School planted red-osier dogwood shrubs during dedication ceremonies in May. Before the school year was over, they had also planted Russian-olive trees.

During the 5 years expected to complete the park project, students will be planting more than 40 species of trees and shrubs, including newly released plants for conservation from the SCS plant materials center in Bismarck.

The idea for the park began with Mrs. W. F. McClelland and her second-grade class. Mrs. McClelland contacted Orlin Lyng, SCS district conservationist, for assistance in developing the 90- by 292-foot lot into an outdoor classroom. SCS state forester Elmer R. Umland worked with Mrs. McClelland to help select trees and a design for the park. The South Burleigh Soil Conservation District and the Lincoln-Oaks Nursery, operated by the North Dakota Association of Soil Conservation Districts, provided trees and shrubs for the initial plantings. ♦

Revegetating Mine Spoils In a Desert Shrubland

by Arnold Nowotny and Bill Wood
State conservation agronomist, SCS, Phoenix, Arizona, and district conservationist, SCS, Casa Grande, Arizona

ASARCO Photo

A drip irrigation system helps establish native plants in the desert shrubland of the Sacaton Mine Unit. Emitters drip about a gallon of water an hour at the base of the plants.

Revegetating mine spoils can be quite a challenge, especially when the mine site is in an arid climate with 8-inch rainfall and the natural vegetation is desert shrub.

In central Arizona, ASARCO Incorporated included revegetation of mine spoils in the overall mining plan for its new Sacaton Mine Unit near Casa Grande. Revegetation began as soon as the plant was constructed in 1973.

Officials of the open pit copper mine became cooperators with the West Pinal Natural Resource Conservation District and sought help in the conservation treatment of their mine spoils from the Soil Conservation Service.

Plans were made to revegetate three types of mine spoils: rock overburden and soil material removed from the open pit mine and tailing material removed from the processing mill.

Several factors were considered in planning the revegetation program. These included the arid climate, the alkali soils, and the total lack of organic matter in the mine spoils. Other important factors considered were the steepness and length of the slopes, which created a severe erosion problem, and the loose, uncompacted construction of the slopes, which caused a drainage problem.

Because of these factors, the conservation plan developed by ASARCO included the installation of a drip irrigation system and the planting of native shrubs and trees.

Native species planted include mesquite, palo verde, bursage, desert broom, saltbush, hopseed bush, and brittle bush. They were selected because of their adaptability to the local environment, fast growth, color, and harmony with the surrounding desert flora.

The revegetation program went into action in January 1974, under the direction of Stuart Bengson, ASARCO agronomist.

The first areas to be revegetated were the water tank hill and parking lot, which were built with the soil material removed from the open pit mine.

Later, some disposal areas of rock overburden were revegetated. These areas were first "capped" with 6 to 8 feet of soil material which had been hauled from the construction

and open pit areas and stockpiled specifically for this purpose. This same procedure will be used to revegetate all the disposal areas constructed, including tailing material.

Gallon-size nursery stock was used to revegetate the slopes. Approximately 2,300 plants were planted on an approximate 10 X 15 foot spacing pattern.

Trees and taller shrubs were planted along the top and bottom edges of the slope to break the smooth, flat visual impact of the edge. Lower-growing shrubs were used to cover and stabilize the slope faces.

The drip irrigation system was then used to help establish the trees and shrubs. The system is designed to emit water at each plant, is portable and especially adapted for use in arid environments. Its primary advantage is the conservation of water. In addition, it is adaptable to remote areas because of its low flow volume and low pressure requirements.

The system consists of flexible tubes of polyethylene with a series of fittings called emitters spaced about 10 feet apart. The emitters slowly drip about a gallon of water an hour at the base of the plants. At this slow rate of application, the danger of water runoff and resulting erosion is virtually eliminated. Another advantage of the system is that the fertilizer is applied to the plants through a drip system filter and fertilizer injector.

When the drip irrigation system was installed, the plants were irrigated twice a week for 8 hours at a time. Now, the plants are irrigated only once a week for 8 hours. Bengson hopes that by this fall the system can be removed and the plants will survive on the natural rainfall.

ASARCO Photo

The water tank hill was one of the first areas to be revegetated in January 1974 (top photo). A year later, the plants showed substantial progress. The drip irrigation system will be removed once the plants are well established and the native species will then survive on the natural rainfall.

This year the revegetation program has expanded to include a variety of planting methods, such as hydroseeding and mulching. Planting trees and shrubs is still the predominant method of revegetation. Eventually, all the mine spoils will be capped with soil material, revegetated, and temporarily irrigated.

The ASARCO revegetation program for the Sacaton Mine Unit has shown remarkable progress and success. In a year's time, the plants established on the water tank hill and parking lot are more than three times their original size.

In time, the open areas between the trees and shrubs should fill in with annual plants as seed is blown in from the surrounding desert and trapped by the shrubs.

ASARCO's work to stabilize and beautify the mine spoils at the Sacaton Mine Unit, and also the Mission and Silver Bell Mine Units, will help restore the areas to a more natural landscape when the mines are eventually closed. ♦

A New Commission For Missouri's Betty Broemmelsiek

by Kent Alverson
Former Head,* Information Unit,
Midwest Technical Service Center,
SCS, Lincoln, Nebraska

Betty Broemmelsiek, chairman of the Missouri State Soil and Water Districts Commission, checks the beef herd on the 550-acre family farm near Defiance.

Betty Broemmelsiek was out in the field mowing hay when she got a telephone call asking her to be a supervisor on the St. Charles County (Missouri) Soil and Water Conservation District Board. That was in July, 1967.

Today, Betty Broemmelsiek is still making hay—on the farm and in the administration of Missouri's conservation programs. She's now the chairman of the new Missouri Soil and Water Districts Commission—the first woman in the country to hold such a post.

She has come up steadily in responsibility in the state, starting as a district cooperator with her husband Jack in 1961, becoming the first woman in Missouri to be named conservation district supervisor in 1967, and now heading the Commission, which was formed in January in a reorganization of state government. The Commission is in the Division of Environmental Quality in the State Department of Natural Resources. Formerly, a similar committee had reported directly to the Governor.

Through the years, Betty Broemmelsiek has refined a list of eight goals she feels to be the "big job ahead" for conservation districts, and as state commission chairman, she's working to help—

- —increase food production without damage to the land
- —protect prime agricultural land
- —increase district authorities and capabilities in sediment and nonpoint pollution control
- —enlarge the role of the district in flood plain management
- —accelerate land inventories, soil surveys, and land use planning
- —improve the management of forest lands
- —employ more technical and administrative personnel with local and state funds
- —strengthen the reputation of districts as responsible, capable conservationists.

Encouraged by much that has gone on in the state, she and her fellow commission members are acutely aware that two-thirds of the land in Missouri still lacks adequate conservation treatment. She's hopeful they can get additional state funding to do the job and also encourages districts to draw more people into volunteer conservation work.

One of the untapped natural resources to do this job are women, she notes.

"Many a Missouri woman has fought for the land, helped clear it and populate it. They are naturals for the job. Forty percent of the land is owned by women and they control the rest, so let's put them to work to conserve it."

* Mr. Alverson retired in June 1975.

Before her four children graduated from home, Mrs. Broemmelsiek found erosion problems on the family's 550 rolling acres about all she could think about. Now she finds the days "unbelievably long" and has time to help others with conservation problems.

St. Charles, her home district, is an urban-oriented county just across the Missouri River from St. Louis. Positioned at the confluence of the Missouri and Mississippi Rivers, it faces continual challenges of flooding, erosion, and other soil and water problems. People problems mingle with the natural resource problems. There is competition for the available land for home building, industry, farming, truck gardening, and all manner of farm and city enterprises.

Living and working in such an area can be a rich educational experience. Mrs. Broemmelsiek and her coworkers are not missing the opportunity.

"To dramatize the problems that come from being bordered by the two greatest rivers in the country, we are using a new film called 'Planning for Floods,'" she said. "It was filmed in St. Charles County by the Environmental Defense Fund with our own district conservationist, Les Volmert, as one of the stars.

"Another educational service we're offering is farm tours for children. We have found that if boys and girls don't live on a farm, even though there is one a mile away, they know very little about what is going on."

In addition, she's recently prepared a slide-tape presentation on St. Charles County for schoolchildren. The show includes the geologic origin and history of the county as well as its agriculture and conservation practices.

Probably the most widely known activity in the St. Charles Soil and Water Conservation District is the annual "Fish for Fun" contest held in April.

This benefit program usually nets $2,000 for the district. About 20 ponds are opened to the public, with the pond owner collecting $1 per fisherman for the district.

"The publicity for 'Fish for Fun' involves all of us," Mrs. Broemmelsiek said. Some 20,000 flyers are circulated and local papers and broadcast media are contacted.

The district's annual dinner meeting is another popular and widely attended event.

"This is where we hope education catches fire and turns into action," Mrs. Broemmelsiek said. "We try to have an interesting, fast-moving program. We hope that each farm family will be inspired to plan and carry out one new conservation practice in the next year." ♦

"Fish for Fun" is a project that nets both fish for the fishermen and income for the St. Charles County Soil and Water Conservation District for the promotion of conservation.

Soil Surveying The Nation's Capital

by Anne Zack
Information Division, SCS, Washington, D.C.

The first all-urban detailed soil survey is nearing completion in Washington, D.C., and will be published during the Bicentennial.

It is being conducted by a Soil Conservation Service team headed by Horace Smith, a soil scientist at the Maryland state office. The National Park Service, which manages one-fourth of the land in the District of Columbia, is sharing the cost of the survey, and the Washington Technical Institute, D.C. Department of Environmental Services, U.S. Geological Survey, and University of Maryland are cooperating with SCS on the project.

Although SCS has mapped urban areas since 1966, the D.C. soil survey will be the first published survey geared entirely to the urban resident. Unlike most other surveys, it will feature sections on landscaping, pollution-tolerant plants, home gardens, and grasses for lawns. Of historic interest will be maps made by Pierre Charles L'Enfant, planner of the Capital City.

The need for soil surveys of urban areas is evidenced by the demand for soils information in Washington. Officials at the D.C. Office of Environmental Planning have found the detailed soil map so useful that they are putting together completed sections of the map as a base for decisions in land use planning now, without waiting for the survey to be published.

The completed soil survey will cover all 44,160 acres of the District and will provide a wealth of information for land use planning. For instance, it will point out soils that have wetness, slippage, and erosion problems as well as soils that offer good construction sites.

For example, the southeastern part of Washington is on the Coastal Plain. Because of its texture, much of the soil in this area tends to slide downslope when it is saturated. Erosion and the activities of construction hasten the slipping.

With sightseers in the backgrou

During the heavy rainfall from Hurricane Agnes in 1972, one man's backyard slid downhill. The "O Street Slide," as it is called, still blocks one entire lane of the street.

At an apartment building in the same area, half an asphalt parking lot followed the soil downhill, leaving an abrupt drop. The building owner erected a chain link fence to keep people from driving off the edge at night.

Unlike the Southeast, northwest Washington is in the Piedmont geologic province where erosion and landslides

:ground, SCS Soil Scientists Ed White and Horace Smith take soil samples near the Lincoln Memorial.

are generally not severe problems. However, many streams and underground springs have been filled and covered by construction. Homeowners in the northwest — and engineers building a new subway—are occasionally confronted with structural damage caused by the springs, seepage, and drainage problems.

If the survey had been done years ago, it would have helped solve many Park Service problems, according to James C. Patterson, a research agronomist there.

For example, the Japanese cherry trees that line the Tidal Basin around the Jefferson Memorial are beautiful and the setting is picturesque, but the Park Service has trouble keeping the trees in good condition. Many of the original trees have been replaced. A soil survey would have shown that the water table there is too high for the trees, and other sites, or modification of the existing site, could have been considered for the gift from Japan.

In West Potomac Park, near the Washington Monument and the Lincoln Memorial, the Park Service couldn't get grass to grow. It reseeded the area several times with little success. One of his first assignments, Patterson called for a soil test and conducted a greenhouse experiment. The results showed the soil was extremely acid, with a pH of 2.6. The Park Service had to either remove and replace the soil or use a road grader to mix 80 tons of lime per acre—more than Patterson had ever heard of using —with 12 inches of soil to establish the grass.

A soil survey would have flagged the acid soil in that area, and the Park Service

Smith maps soils near the Prince George's County, Maryland, line.

could have considered excavating the soil and bringing in topsoil from other sources.

The Park Service, in construction of the Bicentennial park, Constitution Gardens, rebuilt more than 42 acres of soil by mixing Beltsville compost—a mixture of wood chips and sewage sludge—and leaf mold with existing urban soil. The project cost more than $200,000, but alternatives would have cost nearly $500,000.

One reason the Park Service was able to build Constitution Gardens economically was that it did not have to purchase large quantities of topsoil. Patterson investigated the site and discovered some topsoil available for the rebuilding project at one end of the area. A soil survey would have shown the source of topsoil and Patterson's search would not have been necessary.

The Park Service, like the D.C. government, has already borrowed completed map sheets and uses them for studies of erosion along streams. The finished survey will also provide the Park Service with needed information on managing soils for ornamental plants, shade trees, flowers, and woodland.

The momentum for a D.C. soil survey began almost 7 years ago when students at an elementary school discovered they needed soil survey information to plan a 5-year ecology project for their school grounds. They contacted the SCS state office in Maryland, which has responsibility for the District. Ernest L. Moody, who is now SCS district conservationist for Washington, D.C., provided the necessary information and helped with the project.

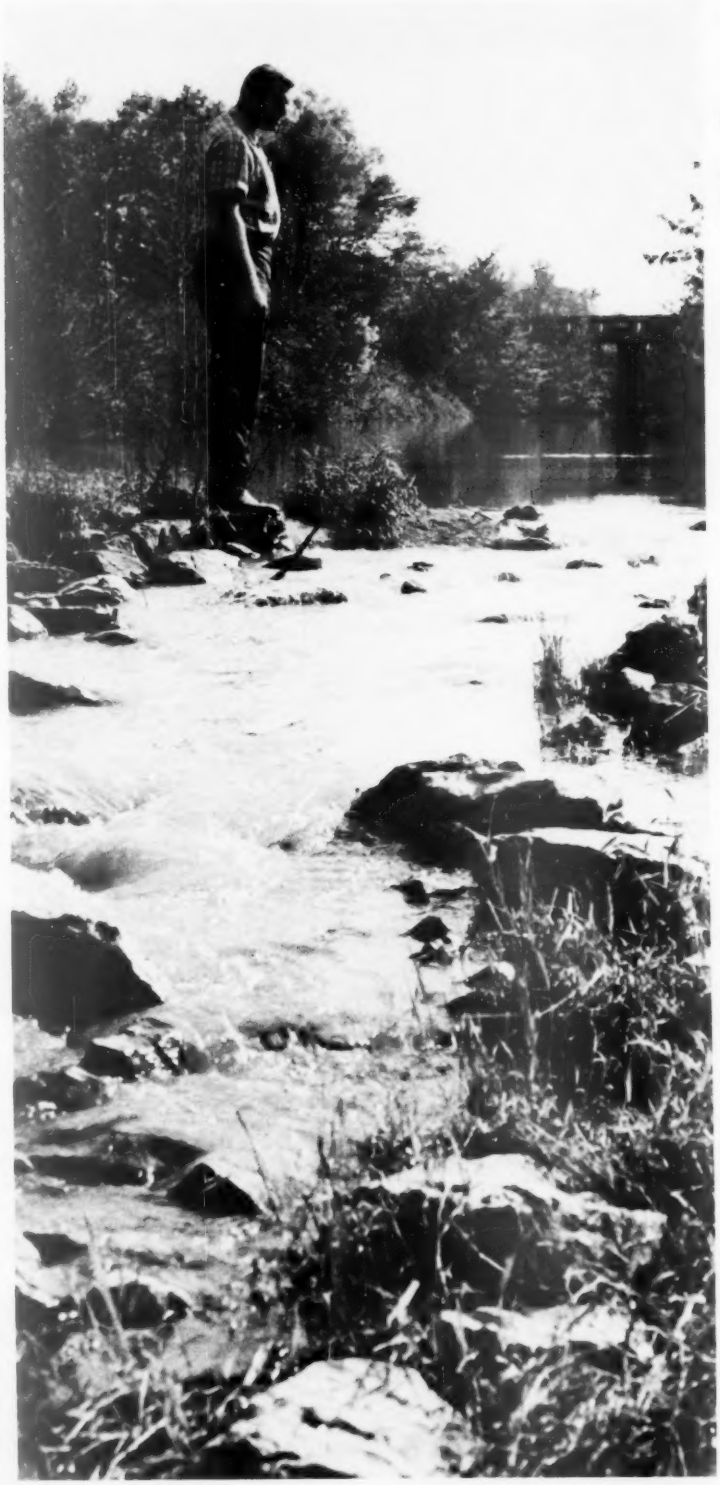
After that, parents involved in the project requested soil surveys of their own property. Interest in a District-wide survey spread from these parents to local civic groups.

The Citizens Council for a Clean Potomac was among the groups which wrote letters to the District government and USDA requesting the survey. The council plans to use the survey in campaigns to reduce sedimentation and pollution throughout the Potomac River basin.

The soil survey will point out areas that are likely to erode and pour sediment into the Anacostia River as well as the Potomac.

Although SCS makes soil surveys mainly of agricultural land, it is making more and more urban surveys as city officials and urban residents, such as the ones in Washington, D.C., demand information about their soils to use in improving their environment. ♦

Among the soil problems in the Nation's Capital is slippage in the southeast, such as in the apartment parking lot at right. Below, SCS Soil Scientists Smith and Linton Wright, Jr., map in the heat and humidity of a Washington summer. At far right, White and Smith map in Lafayette Square in front of the White House.



'The Way A Stream Should Be'

by Jim Bilyeu
Information officer,
SCS, Nashville, Tennessee

A biological marvel is quietly taking place in streams in the northwestern corner of Tennessee.

The area involved is in the Thompson Creek Watershed, authorized in 1958 as one of the first Public Law 566 watershed projects in Tennessee.

A team of university biologists have found that water quality in the streams and branches of the watershed has been substantially improved, turbidity has been drastically reduced, and oxygen content is almost at the saturation point —to the extent that the streams now support a growing array of valuable species of aquatic plant and animal life.

Dr. Ted James, chairman of the Department of Biological Science at the University of Tennessee at Martin, and a team of biologists made extensive samplings for stream habitat assessment and water quality studies during the summer of 1973 under a contract from the Midwest Research Institute of Kansas City, Missouri. The study, for an environmental impact statement for the U.S. Army Corps of Engineers, extended to the Obion River sys-

Jimmy Spencer, district conservationist in the Weakley Soil Conservation District, looks at rock riprap in Capps Branch.

tem and included Reelfoot Lake and its tributaries.

Thompson Creek is a tributary of the Middle Fork of the Obion River and lies in Weakley and Henry Counties. Dr. James' group chose Capps Branch, a tributary of Thompson Creek, as one of the streams to study because of its accessibility and also because it had been man-altered during development of the Thompson Creek Watershed Project by the Soil Conservation Service.

"We were in Thompson Creek checking for the presence of invertebrates, and what we found was pretty impressive," said Dr. James. "The lack of turbidity was the first thing that struck me. Thompson Creek is like a stream one would expect to find where there is no active agriculture. The water was clear and running fast," Dr. James said, ". . . It's the way a stream should be. But I expect that's a reflection of the effectiveness of some of the watershed project's conservation measures."

The biologists were particularly excited about finding clams and attached algae in the streams. "The clams are small, but they're in there," Dr. James said. "And that's the kind of animal that silt will cover up. They simply can't survive in a stream that's carrying a heavy silt load. If you consider that an animal like a clam is a filter feeder and must circulate water through its body to filter food out of it, then its presence is a pretty good indication that the water quality is high."

The presence of attached algae—which the researchers found in the channels— is almost required for any stream to be productive, according to Dr. James. "We found dragonflies, caddisflies—the sort of insects that are at the base of a lot of food chains; and that's probably why a lot of fish like to gather along that stretch of the channel," Dr. James continued. "From that standpoint, based on that one observation, the streams in the upper portions of the watershed are considerably different than they are farther downstream. They are also in much, much better shape from a biological standpoint because, at least in the streams where we were taking samples, there was not as much siltation, whereas the main channel of the Obion-Forked River virtually cannot support these kinds of fauna.

"Any time we got out of the fairly small streams into the main channel, say the Middle or North Fork of Obion, the number of invertebrates went down—way down—and diversity went way down, too," Dr. James said. "There's an indication that the small feeder streams are the ones that are productive. The main channel itself is not."

Dr. James E. Deck, assistant professor of biological science at Martin and also a member of the study team, made some equally impressive finds in his study of fish fauna in Thompson Creek and Old Town Creek. The fish collections were made after work on Thompson Creek was completed and before much work on Old Town Creek was begun.

In his report Dr. Deck listed approximately 50 species known to exist in the two creeks. In the two watersheds probably fewer than 10 additional species occur that have not been collected, according to Dr. Deck's report. Since the total number of species found in the Obion-Reelfoot system is slightly more than 100, the fish fauna of these two watersheds is quite diverse. The fauna is generally typical of the upper parts of the Obion River.

The species composition is of fish that generally require moderate water current with little siltation and little turbidity. Casual observation suggests that the invertebrate popula-

tion may be rather large and diverse compared to more downstream areas. These invertebrates would help to explain the diversity of fish since several invertebrate feeders are found in reasonable abundance. Several species of fish with broad tolerances occur in these two watersheds as they do in many others, including more downstream and disturbed areas.

But the streams and branches haven't always been so clean and productive, according to Herman L. Hearn, a lifelong resident of the Ore Springs community and a director in the Thompson Creek Watershed District.

"Years ago, before the project was started, Thompson Creek just spread out all over the bottoms. It was so full of sediment that it dried up during part of the year," Hearn said. "By the time the project started, there just weren't many fish in the creek, mostly just bullfrogs."

The Thompson Creek Watershed Project, authorized in 1958, included plans for five small dams at key locations within the 18,700-acre project area to trap floodwaters and sediment in the upper portions of the watershed. Provisions were also made for channel modification to include enlargement and sediment removal with some realignment on about 13 miles of the creek. Generally, bottom widths vary from about 20 feet, where Thompson Creek empties into the North Fork Obion River, to some 4 feet in the upper reaches of small sidestreams.

Before work on the dams and other construction activities could begin, a comprehensive land treatment program had to be carried out by the Weakley County Soil Conservation District and the Thompson Creek Watershed District. The work included reforesting more than 2,000 acres of severely eroding land. About 5,000 acres of pastureland were seeded to help hold the soil in place. Other work included the installation of thousands of acres of conservation farming systems including waterways, rotations, and contour cultivation.

At about the time the land treatment work began, the Tennessee Wildlife Resources Agency (then, Tennessee Game and Fish Commission) released 93 white-tailed deer—40 bucks and 53 doe. These were the nucleus of a flourishing herd that yields a bumper crop for deer hunters each year. During the 3-week deer season in 1973, more than 300 deer were taken by hunters and counted at checking stations operated by officers of the Tennessee Wildlife Resources Agency.

Today, some 16 years after the land treatment phase of the Thompson Creek project began, groves of loblolly pine trees hold the once erosive gullied areas in place under a thick canopy of branches and blanket of pine needles. Cattle graze on pastureland that was once eroding idle fields. Wildlife plantings support a wide variety of upland game. The lakes, which were built after the land treatment was installed, offer a resting place for a variety of waterfowl. The largest of the five lakes, 183-acre Garrett Lake, was designed to be used for flood prevention, recreation, and fishing through a cooperative arrangement between the Soil Conservation Service and the Tennessee Wildlife Resources Agency.

The lake traps storm water and sediment from more than 2,200 acres of rolling landscape. True, the land is still scarred by gullies; but they are healing now under lush growing stands of planted pine trees and green expanses of pastureland. In preproject days, the land behind the dam that forms Garrett Lake bled tons of sediment into the streambeds after every rain.

A series of grade stabilization structures, placed at required locations along Capps Branch, are made of interlocking steel piling with rock riprap on the downstream side and create a waterfall effect. The waterfall action also mixes more life-giving oxygen into the water. In tests for dissolved oxygen, the biologists found the water to be about one part per million below saturation.

The Tennessee Wildlife Resources Agency collected fish from the pools, and a rather large variety was found. "We sampled the same area but found only four species," Dr. Deck said. "The difference is probably due solely to collecting methods since specialists of the Wildlife Resources Agency applied rotenone and we used seines."

Dr. Deck's report goes on to predict that the effect of the pools in small streams such as Capps Branch will be to modify the fish fauna in abundance and diversity. Several species will probably increase in abundance. Such forage species as gizzard shad, golden shiner, topminnows, and mosquitofish would likely become more abundant in the slower water habitat. Dr. Deck's report concludes that an increase of these types would facilitate an increase of some other slower water fish-eating forms such as several species of sunfish, bass, and crappies. Probably some rough fish such as carp, gar, and bowfin would increase as well. ♦

South Dakota Conservation District Sets Up 'Drive It Yourself' Tour

A "drive-it-yourself" conservation tour has been developed by the Lincoln Conservation District in South Dakota with the assistance of the Soil Conservation Service.

The tour has 20 stops along a 12-mile route in Newton Hills State Park in Lincoln County. To give a better understanding of the work local farmers are doing to protect their land, the tour includes terraces, waterways, diversions, field and farmstead windbreaks, and Lake Lakota, a flood prevention and recreation area—part of the Pattee Creek Watershed Project.

The conservation district also has prepared a color pamphlet, distributed at the park entrance. The pamphlet explains the benefits of the conservation practices depicted along the tour.

Dick Fossum, chairman of the board of supervisors of the Lincoln Conservation District, reports initial printing of the pamphlet was 5,000 copies, and requests have come in from several states, including New York and Colorado.

Among those farming in the tour area is the president of the South Dakota Association of Conservation Districts, Roy Larsgaard. — Joyce Watkins, SCS, Huron, South Dakota. ♦

DRIVE-IT-YOURSELF
Conservation Tour
LINCOLN COUNTY
SOUTH DAKOTA
NEWTON HILLS STATE PARK
The Lincoln Conservation District invites you to join them on a twelve mile tour of Conservation practices. We hope this will give you a better understanding of the work that the local farmers are doing to protect their land.
The map (inside) will show you the route. The circled numbers on the map refer to numbers along the tour route and the numbers to the right of the map.
The roads are "all weather" surfaced; rain will not be a problem. Drive carefully and enjoy our agricultural scenery.
LINCOLN CONSERVATION DISTRICT
CANTON, SOUTH DAKOTA

Copies of the "drive-it-yourself" conservation tour are distributed at Newton Hills State Park by parkettes employed by the South Dakota Department of Game, Fish, and Parks.

Prime Lands Seminar Makes Recommendations to USDA

by R. Neil Sampson
Resource Development Division, SCS, Washington, D.C.

The U.S. Department of Agriculture should be a strong advocate of protecting prime agricultural lands and oppose actions that would impair the nation's natural resource base for agricultural productivity.

That was the consensus of participants at the national Seminar on the Retention of Prime Lands sponsored by the USDA Land Use Committee in July. The Land Use Committee is an interagency group that recommends policy and program initiatives related to land use to the Secretary of Agriculture.

Seminar participants stressed throughout the sessions that the fate of America's prime food, fiber, and timber-producing lands should be a concern of USDA, even though the supply of land seems adequate to meet current and short-term needs.

Eighty land use and agricultural specialists from federal, state, and local agencies, universities, industry, private research institutions, agricultural organizations, and citizens' groups participated in the seminar. They prepared situation papers and recommendations to USDA dealing primarily with one major question: How important is the continued shift of prime agricultural land into other land uses that may, for all practical purposes, remove the land from agricultural production permanently?

Estimates developed by the USDA Economic Research Service, using census data, recent production and export trends, and the 1967 Conservation Needs Inventory, indicate ample undeveloped land in Capability Classes I, II, and III to meet food production

At the Seminar on the Retention of Prime Lands, reports were developed in small working groups, then presented to the seminar for adoption. This group's task was to consider methods of implementing plans to guide land use. Shown are (l. to r.) Milton Patton (back to camera), Council of State Governments, Chairman; Warren Zitzmann, Soil Conservation Service; Robert Anderson, Langston University (Oklahoma); Stanwood Cath, National Association of State Departments of Agriculture; Robert W. Long, Assistant Secretary of Agriculture; Einar Roget, Forest Service; David Mosena (foreground), American Society of Planning Officials; Alice Klavans, League of Women Voters; and Wallace. Washbon, Agricultural Consultant (New York.)

needs under normal population trends, continued increases in productivity per acre, and normal levels of export.

The conference recommendations noted that these assumptions should not be used, however, to reach the conclusion that there was little concern in America for protecting the prime producing lands. To the contrary, the draft report cited reasons for immediate concern at all levels of government. These include:

—Existing data are inadequate to indicate what is happening to prime lands. The top yielding lands of the country have not been identified and inventoried to provide information on how much prime land exists, where it is located, or the present and possible future rate of its conversion to other uses.

—National production needs as expressed in the analysis of total food production and total cropland acres may mask important shifts in land use that occur on a local, statewide, or regional scale. Some areas of the country are deeply concerned about the loss of agricultural land because of economic, social, and environmental impacts on communities or regions.

—Much of the Class I, II, and III land remaining in the country may be in small scattered tracts, fragmented ownerships, or areas lacking an established agricultural infrastructure. The economic costs of bringing such land into production may be much higher than with the costs of retaining productive prime land in its present use.

—There is no clear evidence that land use controls, financial incentives, tax programs, or other devices used to date have been successful in retaining prime agricultural lands. If USDA, states, or localities decided to embark on active programs to retain prime lands, a great deal of research and experimentation may still be required.

Seminar participants recommended that USDA:

—Seek establishment of a Land Resources Council or a combined Land and Water Resources Council, patterned after the existing Water Resources Council, to provide a coordinated federal input into future land use policies and programs of the federal government.

—Advocate a policy of retention of prime agricultural lands. Federal programs should avoid, wherever possible, the diversion of highly productive croplands to nonagricultural uses. Federal agencies preparing Environmental Impact Statements on projects that would take prime lands should demonstrate that the intended use is more in the public interest than agriculture.

—Encourage the development of a national classification system and move speedily to inventory the amount and location of prime lands. This system should be based on the soil survey, with the addition of economic and other criteria if possible. Soil surveys should be completed as rapidly as possible on agricultural lands.

—Utilize its educational and technical assistance programs to help state and local governments evaluate different implementation techniques that may be helpful in efforts to retain prime land in production.

The recommendations from the seminar are currently under study by the USDA Land Use Committee, and it is certain that the subject of prime agricultural land will be a topic of policy discussion in the Department for some time. ♦

Prime Lands

Background papers for the Seminar on the Retention of Prime Lands have been published in a 257-page document, "Perspectives on Prime Lands."

The publication contains 9 major papers and 36 reviews covering the prime lands question. Differing viewpoints on the extent and importance of the issue, along with many suggestions for local, state, and USDA action are expressed.

Copies are currently being distributed through SCS, Extension Service, Farmers Home Administration, Forest Service, and the Council of State Governments. Additional single copies are available from the Information Division, Soil Conservation Service, Washington, D.C. 20250.

Preparation of the seminar proceedings and recommendations is underway, with publication anticipated in December 1975.

Recon . . .

Topsoil loss. Statewide, about half of the topsoil on unprotected sloping land in Iowa has eroded away since it was first cultivated 100 to 150 years. That estimate by Lacy Harmon, SCS's state soil scientist in Iowa, translates into about 6 inches of topsoil on land that initially had from 12 to 16 inches. Harmon estimates that on much of the sloping land in the state, losses average 13 tons an acre—a twelfth of an inch of topsoil—a year.

Farmers, who once formed the bulk of business for SCS in Harris County, Texas, now make up only one-tenth of 1 percent of the population, notes SCSer David L. Myers in an interview in the Houston Chronicle. "Less of our work is concerned with the rural land user and more with the city dweller," said Myers, district conservationist in Houston for the 1.2-million-acre county. About half of the telephone calls his office receives are about flood plains, plain management, or flood control.

Soil surveys

Arizona

Apache County (Central Part). By Mack L. Miller and Kermit Larsen. 1975. Soil Conservation Service in cooperation with Arizona Agricultural Experiment Station. 71 pp., illus.; maps.

Florida

Holmes County. By Julius L. Sullivan. 1975. Soil Conservation Service in cooperation with University of Florida Agricultural Experiment Stations. 61 pp.; illus.; maps.

Georgia

Colquitt and Cook Counties. By John W. Calhoun and Joe G. Stevens. 1975. Soil Conservation Service in cooperation with University of Georgia, College of Agriculture, Agricultural Experiment Stations. 68 pp., illus.; maps.

Iowa

Linn County. By Edward J. Schermerhorn and John D. Highland. 1975. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station, Cooperative Extension Service, Iowa State University, and the Department of Soil Conservation, State of Iowa. 149 pp., illus.; maps.

Mitchell County. By Kermit D. Voy and John D. Highland. 1975. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station, Cooperative Extension Service, Iowa State University, and the Department of Soil Conservation, State of Iowa. 125 pp., illus.; maps.

Kansas

Riley County and Part of Geary County. By Donald R. Jantz, Rodney F. Harner, Harold T. Rowland, and Donald A. Gier. 1975. Soil Conservation Service in cooperation with Kansas Agricultural Experiment Station. 71 pp., illus.; maps.

Missouri

Mark Twain National Forest Area. (Parts of Carter, Oregon, Ripley, and Shannon Counties.) By Jerry D. Gott. 1975. Forest Service and Soil conservation Service in cooperation with Missouri Agricultural Experiment Station. 56 pp., illus.; maps.

Oklahoma

Haskell County. By R. C. Brinlee. 1975. Soil Conservation Service in cooperation with Oklahoma Agricultural Experiment Station. 78 pp., illus.; maps.

Oregon

Benton County Area. By Clarence A. Knezevich. 1975. Soil Conservation Service in cooperation with Oregon Agricultural Experiment Station. 119 pp., illus.; maps.

Pennsylvania

Bucks and Philadelphia Counties. By Edward A. Tompkins. 1975. Soil Conservation Service in cooperation with the Pennsylvania State University, College of Agriculture, and the Pennsylvania Department of Environmental Resources, State Conservation Commission. 130 pp., illus.; maps.

Meetings

South Dakota

Marshall County. By Loren D. Schultz. 1975. Soil Conservation Service and United States Department of the Interior, Bureau of Indian Affairs, in cooperation with South Dakota Agricultural Experiment Station. 116 pp., illus.; maps.

Texas

Borden County. By Marvin L. Dixon. 1975. Soil Conservation Service in cooperation with Texas Agricultural Experiment Station. 68 pp., illus.; maps.

Washington

Chelan Area. (Parts of Chelan and Kittitas Counties.) By Vern E. Beieler. 1975. Soil Conservation Service in cooperation with Washington Agricultural Experiment Station. 104 pp., illus.; maps.

Wisconsin

Dunn County. By Gordon N. Wing. 1975. Soil Conservation Service in cooperation with Wisconsin Research Division of the College of Agriculture and Life Sciences, University of Wisconsin. 117 pp., illus.; maps.

Marquette County. By Keith O. Schmude. 1975. Soil Conservation Service in cooperation with The Research Division of the College of Agriculture and Life Sciences, University of Wisconsin. 91 pp., illus.; maps.

October

2–3 *American Forest Institute, Philadelphia, Pa.*
4–8 *American Bankers Association, New York, N.Y.*
5–8 *American Forestry Association, Washington, D.C.*
5–9 *National Association of State Department of Agriculture, Charleston, W. Va.*
5–10 *Water Pollution Control Federation, Miami Beach, Fla.*
7–10 *National Conference of Editorial Writers, Philadelphia, Pa.*
14–17 *Association of Engineering Geologists, Lake Tahoe, Calif.*
15–18 *National Council For Geographic Education, Toronto, Canada*
17–18 *International Women's Year, Syracuse, N.Y.*
19–23 *National Recreation and Parks Association, Dallas, Tex.*
19–24 *SCS State Conservationists Annual Meeting, Mobile, Ala.*
20–22 *Geological Society of America, Salt Lake City, Utah*
23–26 *National Association of Biology Teachers, Inc., Portland, Oreg.*
24–29 *American Institute of Planners, San Antonio, Tex.*
24–31 *National Environmental Sanitation and Maintenance Educational Conference and Exposition, Clearwater, Fla.*
27–Nov. 1 *Adult Education Association of the U.S.A., Salt Lake City, Utah*
30–31 *American Association For Vocational Instructional Materials, Columbia, Mo.*

November

2–5 *Sprinkler Irrigation Association, Scottsdale, Ariz.*
3–7 *American Society of Civil Engineers Convention, Denver, Colo.*
4 *American Seed Trade Association Farm Seed Conference, Kansas City, Mo.*
9–14 *National Water Resources Association, Honolulu, Hawaii*
10–18 *National Grange, Columbus, Ohio*
11–14 *Future Farmers of America, Kansas City, Mo.*
12–13 *14th Annual Purdue Air Quality Conference, Indianapolis, Ind.*
16–19 *American Bankers Association, National Agricultural and Rural Affairs Conference, Houston, Tex.*
16–20 *American Institute of Chemical Engineers, Los Angeles, Calif.*
17–20 *American Association of State Highway Officials, St. Louis, Mo.*
30–Dec. 2 *American Society of Farm Managers and Rural Appraisers, Inc., Dallas, Tex.*

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